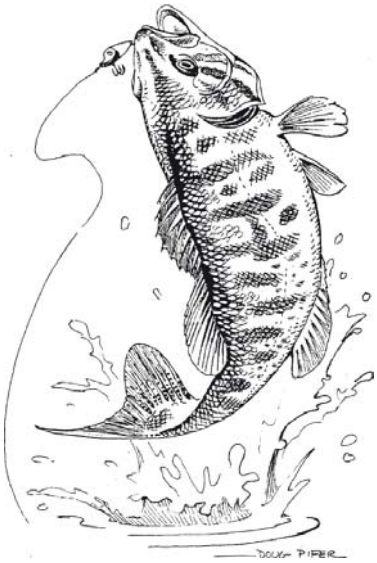
BLUE RIVER SPORT FISH POPULATION ESTIMATES

2002 Fish Management Report

Daniel P. Carnahan
Fisheries Biologist



FISHERIES SECTION
INDIANA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
I.G.C. South, Room W273
402 W. Washington Street
Indianapolis, Indiana 46204

2002
BLUE RIVER SPORT FISH POPULATION ESTIMATES

Crawford, Harrison, and Washington Counties

Fish Management Report
2002

INTRODUCTION

The Blue River watershed is located in south central Indiana and is composed of 125,000 acres in Clark, Crawford, Floyd, Harrison, and Washington Counties (Hoggatt 1975). The Blue River is a tributary of the Ohio River and intersects it about three miles east of Leavenworth Indiana (Figure 1). Most of the watershed in Washington, Floyd, and Clark Counties is agricultural while Harrison and Crawford Counties are heavily forested. The river is best described as a high quality, high gradient stream which receives a substantial portion of its discharge from subterranean sources. The lower five miles of river are more indicative of a southwest Indiana lowland river.

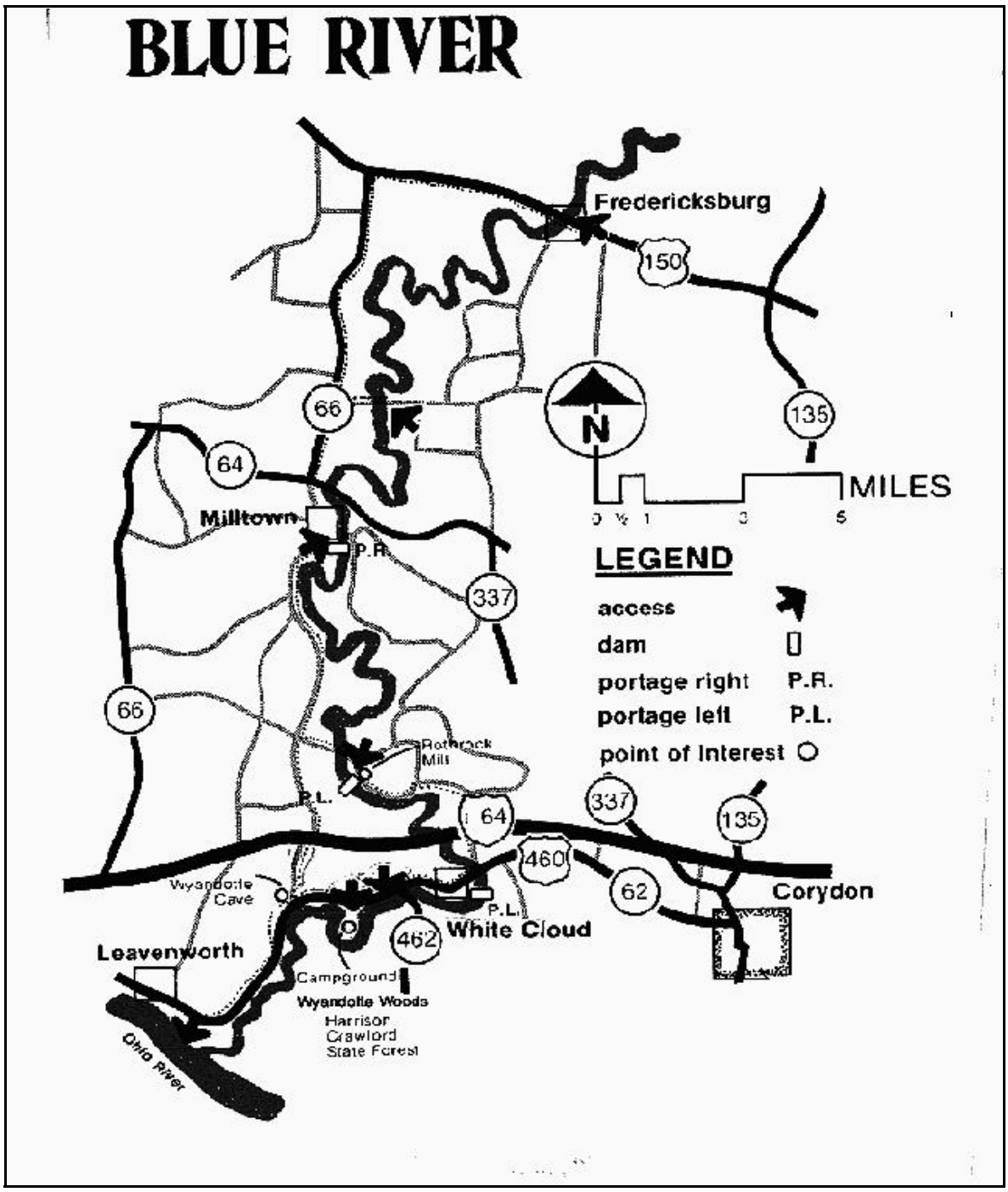
Harrison-Crawford State Forest, Wyandotte Caves, and Wyandotte Woods are located on the lower twenty miles of the Blue River. Forty-five miles of Blue River in Washington, Harrison, and Crawford Counties were designated as a “State Scenic River” in 1975 to help prevent public and private projects which would destroy the river’s natural features.

Eleven species within the watershed are listed by the Indiana Department of Natural Resources as endangered or of special concern. The special status species are; Endangered: Bluebreast darter (*Etheostoma camurum*), northern cavefish (*Amblyopsis spelaea*), spotted darter (*Etheostoma maculatum*), veriegate darter (*Etheostoma variatum*), hellbender (*Cryptobranchus alleganiensis alleganiensis*), clubshell (*Pleurobema clava*), pyramid pigtoe (*Pleurobema rubrum*), long-solid (*Fusconaia subrotunda*) and western cottonmouth (*Agkistrodon piscivorus leucostoma*); Special concern: Salamander mussel (*Simpsonaias ambigua*) and ohio pigtoe (*Pleurobema cordatum*).

Previous Blue River fisheries surveys were conducted in 1972 and 1993 (Janisch 1971, Stefanavage 1995). Sport fish population estimates have been conducted in 1998, 1999, and 2000, and a recreational use survey was conducted in 1999 (Carnahan 1999, 2000, and 2001).

The sport fish population estimates were conducted under work plan 98759 entitled, “Evaluation of Game Fish Populations and Recreational Uses on Indiana Streams.” Work plan objectives are to provide 29,000 angler days with a satisfaction of at least 31% and to maintain the presence of native stream fishes.

Figure 1. Map of Blue River. Map courtesy of Cave Country Canoes.



METHODS

Sampling was conducted from September 18 - 24, 2002 at the same five stations used in the previous sport fish population estimates. Sampling reach lengths were determined from a hand held global positioning system unit. A pulsed D.C. tote barge electrofisher was used to sample fish at four of the stations (RM's 9.0, 14.7, 54.5, and 62.4). A pulsed D.C. electrofishing boat was used at RM 34.6. All electrofishing was conducted during the day. Two dippers collected stunned fish at all stations. Sport fish (smallmouth, spotted, rock, and largemouth bass) were the target species during the survey.

All fish collected were measured to the nearest 0.1 inch and weighed to the nearest 0.01 pound. Scale samples were collected for age and growth analysis. Population estimates were obtained by using the depletion method and expanded with the Microfish 3.0 computer program (Van Deventer and Platts 1986).

RESULTS

Rock bass

A total of 286 rock bass was sampled that weighed 63.13 pounds (Appendix). They ranged in length from 1.3 to 9.9 inches and 41% were at least 7 inches long. Rock bass growth increased by approximately an inch for most age classes compared to 2000 results and is now comparable to the Interior Plateau ecoregion average (Table 1).

Table 1. Rock bass back calculated lengths (inches) at each age, Blue River, 1993, and 1998 - 2002.

	ROCK BASS BACK CALCULATED LENGTH (inches) AT EACH AGE							
Year	1	2	3	4	5	6	7	8
1993	1.9	3.0	4.4	5.8	6.9	7.8	8.6	9.0
1998	1.8	2.8	3.9	5.1	6.5	7.4	8.1	8.8
1999	1.8	2.8	3.9	5.0	6.2	7.3	8.2	
2000	1.8	2.8	3.8	4.9	6.3	7.5		
2002	2.1	3.4	5.0	6.5	7.6	8.4	9.1	
Interior plateau avg.*	2.0	3.6	4.9	6.6	7.2	7.8		

* Shipman, 1997

Rock bass population estimates ranged from 223 per mile (RM 9.0) to 1,080 per mile (RM 14.7) and averaged 589 per mile (Figure 2). Population estimates in 1998, 1999, and 2000 averaged 439, 298, and 113 rock bass per mile respectively. Rock bass population estimates in 2000 for Indian Creek (Green County) (Sapp 2001) and Sugar Creek (Montgomery County) (Keller 2001) averaged 168 and 368 per mile respectively.

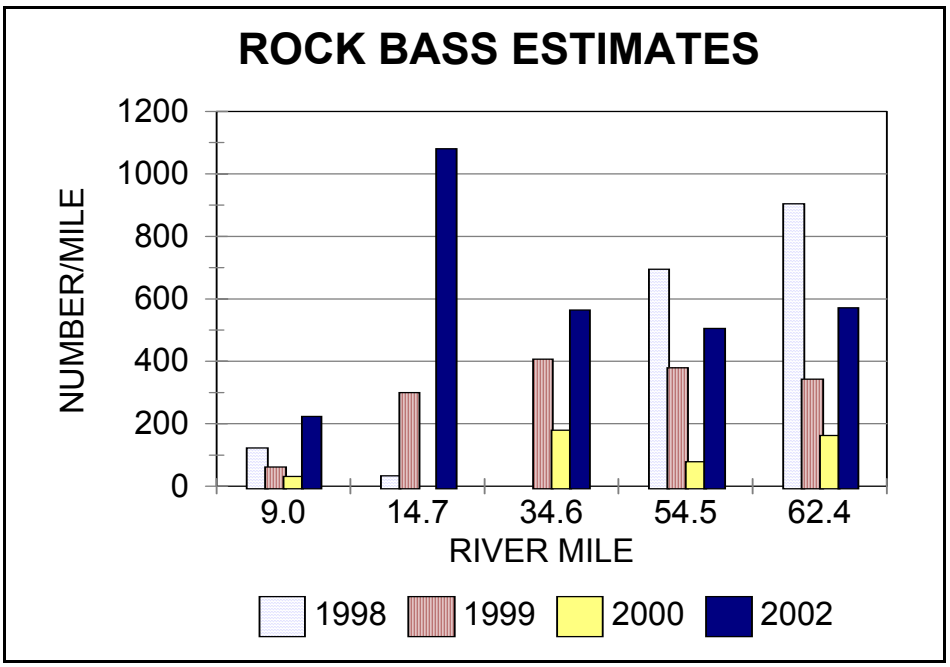


Figure 2. Rock bass population estimates (number/mile), Blue River, 1998 - 2002.

Smallmouth bass

A total of 274 smallmouth bass was sampled that weighed 47.09 pounds. They ranged in length from 1.7 to 15.8 inches and 5% were at least 12 inches long. Smallmouth growth slightly improved since 2000. Growth rates were near the Interior Plateau ecoregion average (Table 2).

Table 2. Smallmouth bass back calculated lengths (inches) at each age, Blue River, 1993, and 1998 - 2002.

	SMALLMOUTH BASS BACK CALCULATED LENGTH (inches) AT EACH AGE					
Year	1	2	3	4	5	6
1993	3.2	6.1	8.7	10.6	13.0	15.0
1998	3.3	5.5	7.9	10.3	12.8	
1999	3.3	5.7	7.9	9.9	12.1	13.3
2000	4.1	6.3	8.6	10.6		
2002	3.8	6.6	9.3	11.3		
Interior plateau avg.*	3.8	6.4	8.8	11.2	12.2	15.0

* Shipman, 1997

Proportional stock density (PSD) values (proportion of smallmouth that are at least 7 inches long divided by the number that are at least 11 inches long) have improved since the imposition of the 12 inch minimum size limit. PSD values were 17 (1993), 21 (1998), 38 (1999), 28 (2000), and 26 (2002). Relative stock density (RSD12) (proportion of smallmouth that are at least 7 inches long divided by the number that are at least 12 inches in length) values have also

improved since the imposition of the size limit (Figure 3). RSD12 index values were 6 (1993), 18 (1998), 28 (1999), 27 (2000), and 14 (2002).

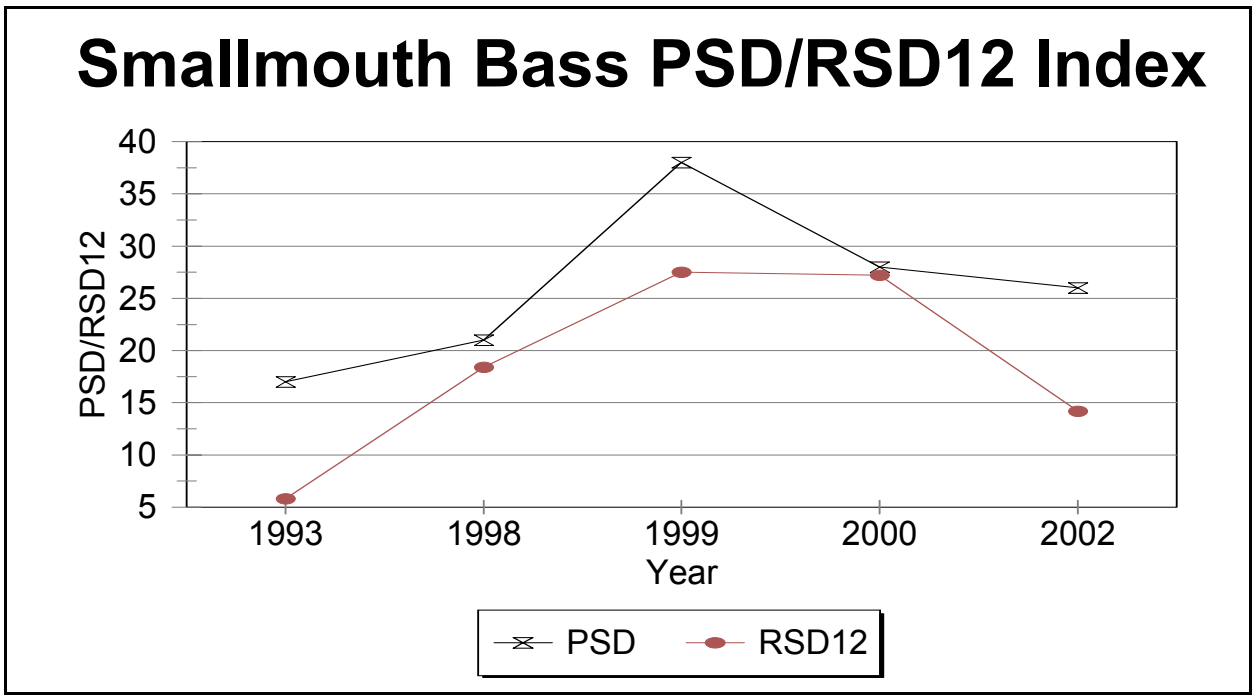


Figure 3. Smallmouth bass PSD/RSD12 index values, Blue River, 1993-2002.

Smallmouth bass population estimates (including young-of-the-year (YOY)) ranged from 263 (RM 54.5) to 985 per mile (RM 9.0) and averaged 647 per mile (Figure 4). Population estimates (including YOY) in 1998, 1999, and 2000 averaged 125, 135, and 114 smallmouth bass per mile respectively. Population estimates excluding YOY ranged from 100 (RM 54.5) to 580 per mile (RM 14.7) and averaged 299 per mile (Figure 5). Previous average population estimates excluding YOY were 96 (1998), 91 (1999), and 57 (2000) per mile.

Spotted bass

A total of 44 spotted bass was sampled that weighed 6.41 pounds. They ranged in length from 2.3 to 13.2 inches. Spotted bass growth was similar to 2000 results and slightly below the Interior Plateau ecoregion average (Table 3).

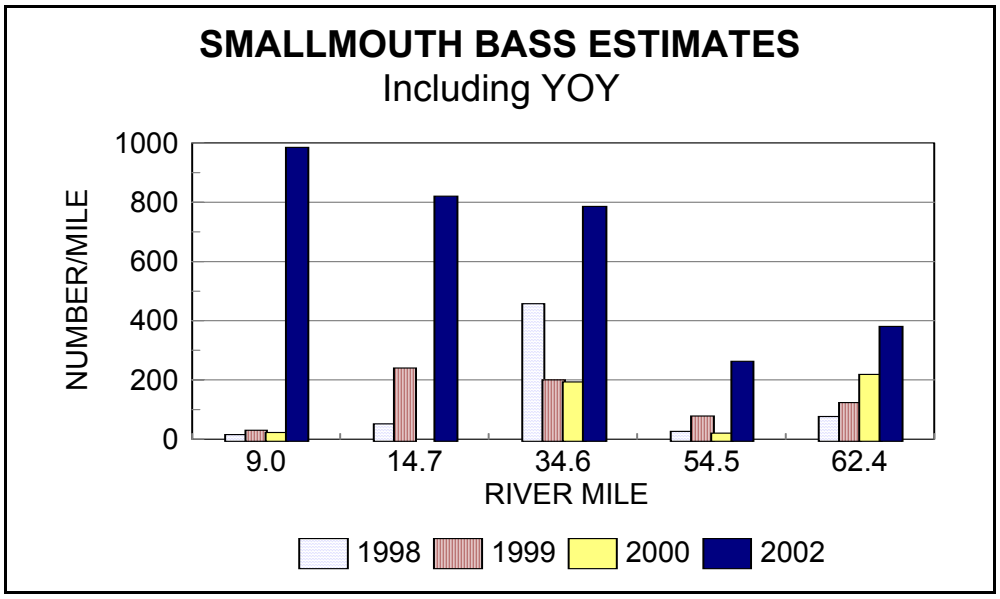


Figure 4. Smallmouth bass population estimates (number/mile) including YOY, Blue River, 1998-2002.

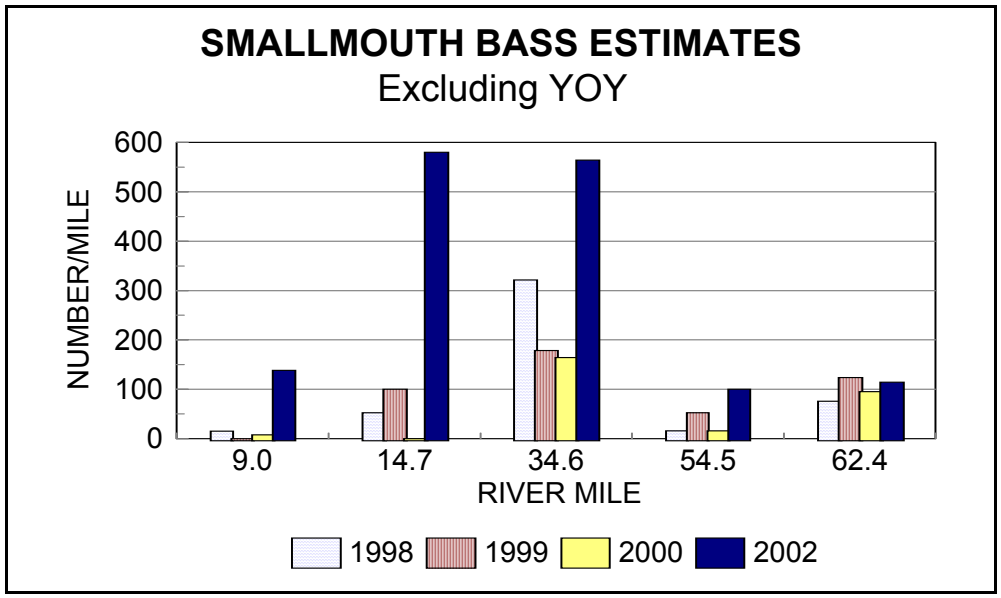


Figure 5. Smallmouth bass population estimates (number/mile) excluding YOY, Blue River, 1998-2002.

Table 3. Spotted bass back calculated lengths (inches) at each age, Blue River, 1993, 1998 - 2002.

SPOTTED BASS BACK CALCULATED LENGTH (inches) AT EACH AGE

Year	1	2	3	4	5
1993	2.3	5.0	7.7	9.5	11.3
1998	3.1	5.7	7.5	9.3	
1999	2.4	4.9	7.3		
2000	2.4	5.5			
2002	2.9	5.8			
Interior plateau avg.*	3.3	6.1	8.3	10.0	11.9

* Shipman, 1997

Spotted bass were sampled at every station compared to only one station in 2000. Nineteen spotted bass were sampled at RM 9 and eight were sampled at RM 14.7, but population estimates for these stations were not valid due to an increasing catch rate. Only two spotted bass were sampled upstream of RM 34.6. The population estimate at RM 34.6 was 107 per mile. In 2000, the estimate was 71 per mile (Figure 6).

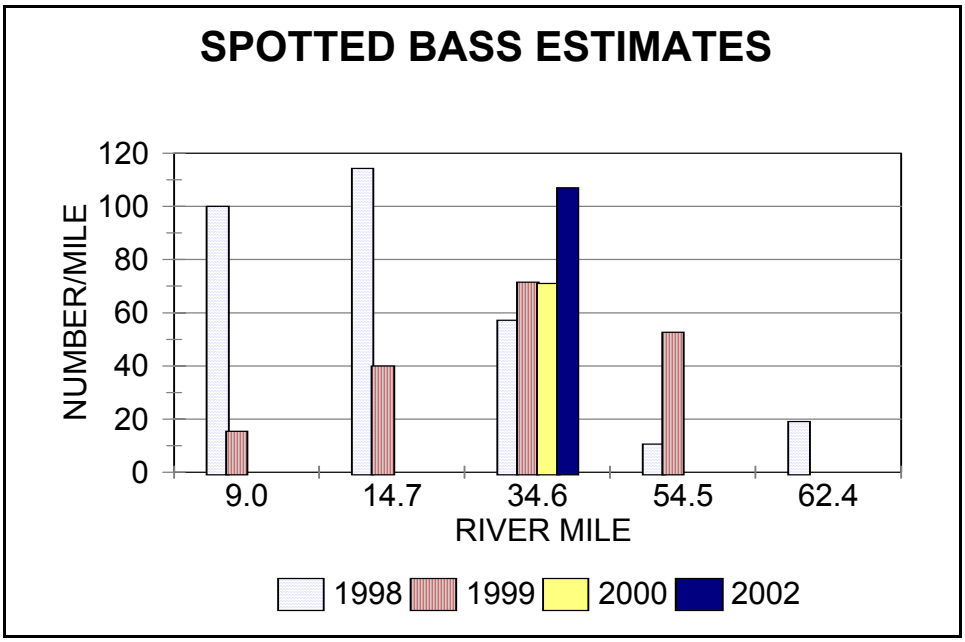


Figure 6. Spotted bass population estimates (number/mile), Blue River, 1998-2002.

Other

Sport Fish

The only other sport fish species sampled was largemouth bass. Population estimates were not calculated for largemouth due to the few number of individuals sampled.

CONCLUSION

Population estimates for both smallmouth bass and rock bass were record highs since the inception of the sport fish population estimates. The average smallmouth bass and rock bass population estimates were 299 per mile (excluding YOY) and 589 per mile respectively. The second highest smallmouth estimate was 96 per mile in 1999. The previous high estimate for rock bass was 439 per mile recorded in 1998. Spotted bass estimates also increased from 71 per mile to 107 per mile at RM 34.6. Spotted bass are more abundant in the lower part of the river. Few spotted bass have been sampled above RM 54.

Sport fish population estimates will be conducted again at the same sampling sites in 2004. The sampling in 2004 will complete the work described in the work plan for the Blue River.

LITERATURE CITED

Carnahan, D.P. 1999. Evaluation of Blue River game fish populations in Crawford, Harrison, and Washington Counties. 1998 fish management report. Indiana Department of Natural Resources. Indianapolis. 13 pp.

Carnahan, D.P. 2000. Evaluation of Blue River game fish populations and recreational uses in Crawford, Harrison, and Washington Counties. 1999 fish management report. Indiana Department of Natural Resources. Indianapolis. 25 pp.

Carnahan, D.P. 2001. Blue River fisheries survey and game fish population estimates in Crawford, Harrison, and Washington Counties. 2000 fish management report. Indiana Department of Natural Resources. Indianapolis. 28 pp.

Hoggatt, R.E. 1975. Drainage areas of Indiana streams. United States Geological Survey. 231 pp.

Janisch, J.L. 1971. Blue River, stream survey report. Indiana Department of Natural Resources. Indianapolis. 53 pp.

Keller, D.C. 2001. Evaluation of the fish community and game fish populations in sugar creek (Montgomery and Parke Counties). 2000 fish management report. Indiana Department of Natural Resources. Indianapolis. 22 pp.

Sapp, S.A. 2001. Evaluation of game fish populations in Indian Creek. 2000 fish management report. Indiana Department of Natural Resources. Indianapolis. 12 pp.

Shipman, S.T. 1997. A survey of fish communities and aquatic habitats at Indiana's major streams with emphasis on smallmouth bass distribution and abundance. Indiana Department of Natural Resources. Indianapolis. 103 pp.

Stefanavage, T.C. 1995. Fisheries survey of Blue River in Crawford, Harrison, and Washington Counties. 1993 fish management report. Indiana Department of Natural Resources. Indianapolis. 55 pp.

Van Deventer J.S., and W.S. Platts. 1986. Microfish interactive program. Microsoft Corporation.

Submitted by: Daniel P. Carnahan, Fisheries Biologist
Date: November 14, 2002

Approved by: _____
Thomas M. Flatt, Fisheries Supervisor
Date: November 21, 2002

APPENDIX

SPORT FISH POPULATION ESTIMATE DATA, 2002